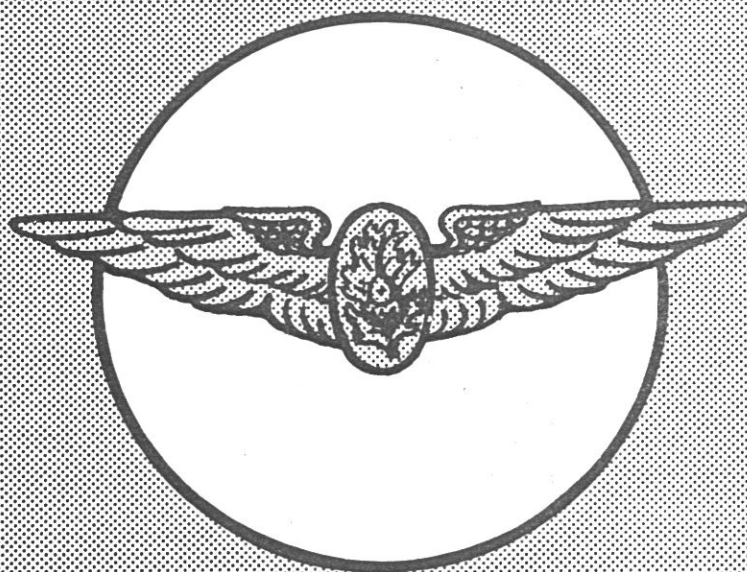




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OF NAVAL AVIATION CADETS:
I. INDOCTRINATION WEEK TO COMPLETION OF PRE-FLIGHT

REPORT NUMBER NM 001 058.26.01



RESEARCH REPORT

OF THE

U. S. NAVAL SCHOOL OF AVIATION MEDICINE

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Report by

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SUMMARY

The adjustment of NavCads to the Naval Air Training Program and the attendant changes in attitude and personality characteristics that take place during this program are of concern to many segments of this society both within and without the military establishment.

The Navy's concern relates to selection and training. Faced with the mission of producing officer pilots, the Training Command must mold a wide variety of personalities into a military pattern. The ease with which such behavior changes can be effected is a function of the plasticity of the individuals under training. If they can be easily modified, or if those who can adjust and make the necessary changes in behavior can be identified, the selection and training problem can be facilitated.

Of further interest is the possibility of finding relationships between the changes that occur in training and training criteria themselves. Current selection methodology is based on a prediction from a cross sectional "picture" of the individual at the time he makes application. It is possible that a "moving picture" of him as he progresses through training may give more insight into his behavior and may be used to predict his ultimate success in training and operational duty.

The present study is a preliminary one aimed at estimating the amount and nature of personality modifications that take place during the four months of Pre-Flight. The Guilford, Guilford-Martin series of tests were used, and a group of 316 NavCads constituted the sample. Significant changes were observed on three traits, Ag (agreeableness), T (thinking introversion-extroversion) and G (general pressure for overt activity). In addition, there was a marked increase in the use of the question mark (undecided) response. These changes and their implications were given tentative explanations.

INTRODUCTION

The Navy views naval aviators as naval officers first and aviators second. As officers, they are expected to behave in certain ways that are compatible with the naval service. They must be able to give and take orders. They must be respectful of their superiors and, in turn, they must be able to command the respect of their juniors. They are expected to be competent in a wide variety of naval duties, for Navy policy calls for continuous rotation into widely differing billets.

The naval aviator must also, of course, be able to pilot a number of different kinds of aircraft in a variety of missions. He may expect operational flying, administrative duty, instructional duty, as well as certain kinds of collateral duties. To the extent that he can meet all these requirements, plus those required of any naval officer, he is a satisfactory naval aviator, and to the extent that he is superior in these respects, he can expect to rise in the naval service.

Precisely what kind of a person the Navy desires for naval aviation duty has never been adequately defined. Hence, it is difficult to know what kind of men to select and how to train those who are selected. Further, it is not known to what extent the characteristics of a good pilot are identical, related or mutually exclusive of the desired characteristics of a good naval officer.

Even if the desired end product of selection and training were known, other questions would require answering. Must a man have these attributes at the time he enters the training program, or can a training program mold a man into the desired pattern? Obviously, training can produce certain changes in people. How much can be accomplished and what side effects may also occur are not known. If any kind of person can be molded into the military pattern, selection ceases to be a problem. However, this seems unlikely, especially in the case of an officer training program. Further, it is not known which kind of person will ultimately make the best pilot-officer. Is it the man who enters the service already possessing the attributes demanded in the end product? Is it the individual who, regardless of the personality structure with which he enters the program, ultimately "conforms" and makes the necessary modifications? Or, is it the man who retains his own structure and merely compromises with military demands while in the military establishment?

Many segments of our society are concerned with these problems, both within and without the military establishment. The interest of the military is obvious. The interest of the civilian society relates to the long term effects of military training, since most of the young men of this nation will probably undergo at least a limited amount of military training during the next decade or two. The adjustment of these men to military life and the resultant changes in attitudes and personality characteristics may have considerable effects on the society as a whole.

The present study is an attempt to obtain some objective evidence of the changes that occur during an officer training program, in this case the Naval Aviation Cadet Program. Although this program may not be considered typical of all military training programs, if reliable changes can be found here, it is likely that changes will also be found to occur in other such programs.

This study also is a preliminary attempt at what may be called "dynamic testing." It has long been recognized that human organisms are not static and that a "still shot" may not present a very adequate picture of an individual. The extent to which people change and the nature of these changes may very well present a more adequate picture of personality dynamics than a single static "exposure", and these changes may have significance for a number of external events, such as performance in training, operational duty, and so forth.

SUBJECTS, INSTRUMENTS, AND DESIGN OF THE INVESTIGATION

A sample of 316 cadets who entered the training program between 18 August and 27 October 1952 were selected as the experimental subjects. This includes classes 33-52 through 43-52, with the unavoidable exception of class 35-52. All the cadets were tested in groups during their indoctrination week.

The tests utilized were the Guilford and Guilford-Martin series, STDCR, GAMIN, and OAgCo (1,2,3,4). The first two were chosen because they were developed on college populations, and the scales in all of them were factor analytically derived. The definitions of trait names were given by the authors and are reproduced below in abbreviated form.

- S - social introversion-extroversion. Shyness, seclusiveness, tendency to withdraw from social contacts, versus sociability, tendency to seek social contacts and to enjoy the company of others.
- T - thinking introversion-extroversion. An inclination to meditative or reflective thinking, philosophizing, analysis of one's self and others, versus an extroverted orientation of thinking.
- D - depression - habitually gloomy, pessimistic mood, with feelings of guilt and unworthiness, versus cheerfulness and optimism.
- C - cycloid disposition, strong emotional fluctuations, tendencies toward flightiness and emotional instability, versus uniformity and stability of moods, evenness of disposition.
- R - rathymia - a happy-go-lucky, carefree disposition, liveliness, impulsiveness, versus an inhibited overcontrolled, conscientious serious-minded disposition.

- G - general pressure for overt activity.
- A - ascendancy in social situations as opposed to submissiveness; leadership qualities.
- M - masculinity of attitudes and interests as opposed to femininity.
- I - lack of inferiority feelings; self-confidence.
- N - lack of nervous tenseness and irritability.
- O - objectivity - as opposed to personal reference or a tendency to take things personally.
- Ag - agreeableness - as opposed to belligerence or a dominating disposition and an overreadiness to fight for trifles.
- Co - cooperativeness - as opposed to fault finding or overcriticalness of people and things.

With the exception of the M scale, higher scores indicate more socially desirable behavior, although extremely high scores may be indicative of some maladjustment. In the M scale, high scores are in the masculine direction.

The design of the study is that of a simple test-retest. The first testing came during indoctrination week. Following this, the NavCads entered the Pre-Flight phase of training, a period of approximately 16 weeks. At the completion of Pre-Flight the sample was retested with the same instruments. The changes on each subscale were then analyzed separately by means of the randomized blocks design, each cadet being considered one block. This analysis has the advantage of reducing the error variance by removing the variation between subjects, thus allowing a more sensitive test of the major (between testings) hypothesis and also allowing a test of the inter-subject variation. In addition to the scale scores, the number of undecided ("?) responses in each test was computed for each subject and analyzed by the same technique.

RESULTS AND DISCUSSION

Table 1 gives the pre-test and post-test means and variances. The significance of the differences in means were found by the randomized blocks analyses listed in Table 2.

Of the scale scores, Ag (agreeableness) showed the most significant shift ($P < .001$). Since the shift was in the downward direction, it should be interpreted as an indication that the cadets as a group became somewhat more belligerent, dominant, or in any event less agreeable. Since a high score may indicate a lack of fighting tendencies, even to the point of

pacifism, the shift here may be a highly desirable one from the viewpoint of those who have the responsibility for training aggressive officers. On the other hand, this shift may reflect an unhealthy state of hostility and rebellion. Since most of these men have had no previous military indoctrination, the highly military regimen of Pre-Flight may have induced attitudes of aggression and feelings of hostility toward the program.

It will be of interest to see if those individuals who showed the most pronounced shifts have further difficulties in adjusting to the program. To the extent that belligerence does exist, there is a problem of channeling these energies into constructive efforts by the training officers. An increase in belligerence may be desirable or undesirable, depending on how it is handled.

The mean score on T (thinking introversion-extroversion) also shifted downward significantly ($P < .01$). This is indicative of a movement toward introvertive thinking on the part of the group. Whether this shift is a desirable one from the point of view of the Naval Air Training Command is of course unknown. It has been observed that individuals who score on the introvert side of this scale sometimes have a small but distinct advantage over the man who scores on the extrovert side, since the latter individual often tends to be so taken up with social interactions that he may be a poor observer of other people and of himself. It may also be that the 16 weeks of concentrated Pre-Flight studying caused this shift.

The third scale score that showed a significant change ($P < .05$) was G (general pressure for overt activity). This would seem to indicate a lowering of activity level for the group. By definition, a high score on this factor indicates strong drive, energy, and activity. Interpretation of the G factor must be done on an individual basis, however. For example, if an individual should be inclined to dominance, his high status on G would make his characteristic behavior more obvious and overt. Thus, it is difficult to discuss this finding without referring to each individual pattern of scores. It is true that these young men had just finished a section of the training program in which much time and energy is devoted to physical development through calisthenics and a rigorous sports program. For many of them, this has been a period demanding much energy and perhaps more activity than at any other time of their life. Therefore, any test item reminiscent of the hours of drill, push-ups, boxing, and football might have a decidedly negative appeal.

Another interesting facet of this study is the marked increase found in utilization of the question mark ("?) response. Although the test authors gave no independent interpretation of "?" responses, a variety of test constructors and test users have been concerned with the use of the question mark response (6). While relatively little is known about it, it may be indicative of two things, 1) hostility toward the testing, and 2) uncertainty of one's attitudes or self concept.

Either or both of these may have operated in this experiment. The testing during indoctrination week was part of a novel experience, and more

desirable test taking attitudes would be expected then, than after 16 weeks of Pre-Flight. Thus, the increase in question mark responses may reflect a change in test taking attitudes.

On the other hand, it seems likely that the impact of 16 weeks in the Training Command, may have had some effects on their attitudes both toward themselves and toward external factors. Self concept theory indicates that attitudes toward self, although organized, are in a constant state of flux and may be revised to assimilate new experiences (5). Many new experiences occur during Pre-Flight, and it is likely that many cadets upon becoming acquainted with the qualities of "officerness" and "aviatoriness" may consciously or unconsciously reevaluate themselves. They learn that certain kinds of behavior are expected of them, and to the extent that these behaviors are not already in their repertory, modifications must be made. The increase in the question mark response may very well reflect ongoing changes and specifically, some uncertainty as to just what they do think about themselves and others. Item analyses of the tests may shed some light on the precise nature of these changes in attitudes.

The change in question mark responses has one other important implication for this study, namely, its effects on the other scale scores. It is possible that the interpretation of the changes in Ag, T, and G is confounded to the extent that question mark responses enter in the scoring of those scales. That is, the changes observed in those scales may be due to an increase in the use of the question mark, and not a group shift on the trait as such. No question mark responses as such are scored in T and G, and only five can contribute to Ag, but unless external factors like test-taking attitudes and uncertainty of attitudes can be ruled out as causes of the question mark utilization, the meaning of the shifts on these three scales is ambiguous. Since these factors cannot be ruled out, the results can be interpreted two ways: 1) they are indicative of true changes in the traits, or 2) they are changes caused by external factors which are reflected in increased use of the question mark. It is of further interest to note that the most significant change (Ag) occurred in the test which elicited the biggest change in use of the question mark.

One final point merits mention: in Table 2, the "between individuals" variation was highly significant for all scales. This means that there was in general a consistency between the cadets' first scores and second scores. That is, the variation between individuals was significantly greater than the variation "within individuals." This consistency is further illustrated in the test-retest correlations, which are listed in Table 3.

On most of the scales there were no significant changes, and this fact is important in and of itself. The interested reader may wish to review the scales on which no changes were found, but detailed discussion of the implications of each of these results would only serve to obscure the primary findings.

All considered, then, it appears that certain changes did take place in this cadet sample through the course of Pre-Flight training although the

interpretation is difficult. The kinds of changes noted are in keeping with what one might have imagined them to be as a consequence of this kind of experience. It is possible that these changes would also have been found to occur in a control sample (e.g., college students of the same age) but due to the difficulty of obtaining an adequate control group and due to the fact that the main intent of the study was to measure the changes that occur in the Naval Air Training Program, the control group design was rejected at the time the study was planned.

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TABLE 1
CHANGES IN PERSONALITY VARIABLES
FROM INDOCTRINATION WEEK TO COMPLETION OF PRE-FLIGHT¹

(N = 316).

Scale	Indoctrination Mean	Completion Mean	Difference	Indoctrination Variance	Completion Variance
S	13.63	13.64	-0.01	82.27	75.70
T	31.76	30.47	1.29**	90.92	104.35
D	12.61	12.55	0.06	90.52	103.20
C	18.77	18.76	0.01	104.08	116.53
R	43.01	43.16	-0.15	112.56	122.31
O	53.01	52.57	0.44	135.33	174.20
Co	65.74	64.78	0.96	222.55	318.18
Ag	35.45	33.54	1.91***	94.83	111.91
G	12.38	11.89	0.49*	17.63	19.77
A	23.08	23.51	-0.43	42.41	46.38
M	25.71	25.57	0.14	12.58	17.47
I	36.97	37.43	-0.46	55.35	66.32
N	30.59	30.25	0.34	41.07	55.65
?-STDCR	12.46	15.74	-3.28***	178.99	305.00*
?-OCaAg	10.89	15.69	-4.80***	126.26	249.59**
?-GAMIN	12.03	15.88	-3.85***	161.39	330.72**
?-Total	35.38	47.31	-11.93***	1123.66	2440.68**

¹ All data were treated in raw score form.

* denotes significance at the .05 level.

** denotes significance at the .01 level.

*** denotes significance at the .001 level.

The four significant variance ratios are indicated in the same way.

TABLE 2

RANDOMIZED BLOCKS ANALYSIS OF CHANGES IN SCALE SCORES

Scale	Source of Variation	df	Sum of Squares	Mean Square	F
S	Testing	1	0.04	0.04	...
	Individuals	315	43,557.07	138.28	7.02***
	Error	<u>315</u>	<u>6,201.46</u>	19.69	
	Total	631	49,758.53		

T	Testing	1	263.39	263.39	8.65**
	Individuals	315	51,919.33	164.82	5.41***
	Error	<u>315</u>	<u>9,590.61</u>	30.45	
	Total	631	61,773.33		

D	Testing	1	0.70	0.70	...
	Individuals	315	53,890.38	171.08	7.56***
	Errors	<u>315</u>	<u>7,130.80</u>	22.64	
	Total	631	61,021.88		

C	Testing	1	0.01	0.01	...
	Individuals	315	60,855.37	193.19	7.04***
	Error	<u>315</u>	<u>8,638.48</u>	27.42	
	Total	631	69,493.86		

R	Testing	1	3.50	3.50	...
	Individuals	315	61,652.72	195.72	5.00***
	Error	<u>315</u>	<u>12,334.00</u>	39.16	
	Total	631	73,990.22		

O	Testing	1	30.13	30.13	...
	Individuals	315	79,354.59	251.92	4.37***
	Error	<u>315</u>	<u>18,146.86</u>	57.61	
	Total	631	97,531.58		

Co	Testing	1	146.23	146.23	1.76
	Individuals	315	144,111.44	457.50	5.50***
	Error	<u>315</u>	<u>26,217.77</u>	83.23	
	Total	631	170,475.44		

TABLE 2 (Cont'd)

Scale	Source of Variation	df	Sum of Squares	Mean Square	F
Ag	Testing	1	579.15	579.15	16.34***
	Individuals	315	53,958.48	171.30	4.83***
	Error	<u>315</u>	<u>11,164.35</u>	35.44	
	Total	631	65,701.98		

G	Testing	1	37.53	37.53	6.07*
	Individuals	315	9,832.30	31.21	5.05***
	Error	<u>315</u>	<u>1,946.47</u>	6.18	
	Total	631	11,816.30		

A	Testing	1	29.27	29.27	2.41
	Individuals	315	24,148.43	76.66	6.32***
	Error	<u>315</u>	<u>3,818.73</u>	12.12	
	Total	631	27,996.43		

M	Testing	1	3.06	3.06	...
	Individuals	315	7,335.74	23.29	3.44***
	Error	<u>315</u>	<u>2,130.94</u>	6.76	
	Total	631	9,469.74		

I	Testing	1	33.27	33.27	1.56
	Individuals	315	31,623.17	100.39	4.72***
	Error	<u>315</u>	<u>6,700.23</u>	21.27	
	Total	631	38,356.67		

N	Testing	1	18.46	18.46	1.12
	Individuals	315	25,263.04	80.20	4.85***
	Error	<u>315</u>	<u>5,204.54</u>	16.52	
	Total	631	30,486.04		

STDCR "?"	Testing	1	1,708.10	1,708.10	15.62***
	Individuals	315	118,005.22	374.62	3.43***
	Error	<u>315</u>	<u>34,451.40</u>	109.37	
	Total	631	154,164.72		

TABLE 2 (Cont'd)

Scale	Source of Variation	df	Sum of Squares	Mean Square	F
OCoAg "?"	Testing	1	3,636.48	3,636.48	39.37***
	Individuals	315	89,294.43	283.47	3.07***
	Error	<u>315</u>	<u>29,097.52</u>	92.37	
	Total	631	122,028.43		

GAMIN "?"	Testing	1	2,339.65	2,339.65	18.30***
	Individuals	315	114,741.57	364.26	2.85***
	Error	<u>315</u>	<u>40,273.35</u>	127.85	
	Total	631	157,354.57		

TOTAL "?"	Testing	1	22,500.70	22,500.70	28.61***
	Individuals	315	875,007.99	2,777.80	3.53***
	Error	<u>315</u>	<u>247,759.80</u>	786.54	
	Total	631	1,145,268.49		

TABLE 3

CORRELATIONS BETWEEN FIRST AND SECOND TESTING

(N = 316)

<u>Variable</u>	<u>r</u>
S	.75
T	.69
D	.77
C	.75
R	.67
?-STDCR	.57
O	.63
Co	.70
Ag	.66
?-OCaAg	.54
G	.67
A	.73
M	.56
I	.65
N	.67
?-GAMIN	.51

For N = 316, $r = .15 \sim P < .01$.